CLAIMS

WHAT IS CLAIMED IS:

1. A kit for determining whether a subject has, or is at risk of developing, colorectal cancer wherein said kit is used to amplify and/or determine the molecular structure of at least a portion of the MnSOD gene.

2. The kit of claim 1 further comprising a first and second oligonucleotide specific for SEQ ID NO: 1.

3. The kit of claim 2 wherein said first and second oligonucleotides can be used to produce a polynucleotide comprising a region of the MnSOD gene, said region including nucleotide residue 351 of SEQ ID NO:1.

4. The kit of claim 2, wherein the oligonucleotides have a nucleotide sequence from about 15 to about 30 nucleotides.

5. The kit of claim 2, wherein the first and second oligonucleotides are labeled.

6. The kit of claim 2, wherein the first oligonucleotide is specific for the MnSOD Ala allele and the second oligonucleotide is specific for the MnSOD Val allele.

7. The kit of claim 1 further comprising one or more oligonucleotide probes specific for the MnSOD Ala allele and the MnSOD Val allele.

8. The kit of claim 7 wherein said probes are detectably labeled.

9. The kit of claim 8 wherein said probes are fluorescently labeled.

10. The kit of claim 9 wherein said probes are labeled with a quenching molecule.

11. The kit of claim 7 wherein said probes are bound to a surface.

12. The kit of claim 1 further comprising an allele specific endonuclease.

13. A method for determining whether a subject has, or is at a risk of developing, colorectal cancer comprising determining the identity of the allelic variant of the MnSOD gene in a nucleic acid obtained from the subject.

14. The method of claim 13 further comprising contacting the subject's sample nucleic acid comprising the MnSOD gene with a probe or primer which hybridizes to the polymorphic region of the mitochondrial targeting sequence of the MnSOD gene , said polymorphic region including nucleotide 351 of SEQ ID NO:1.

15. The method of claim 13, wherein determining the identity of the allelic variant comprises determining the identity of at least one nucleotide of the polymorphic region.

16. The method of claim 13, wherein determining the identity of the allelic variant comprises performing a restriction enzyme site analysis.

17. The method of claim 13, wherein determining the identity of the allelic variant is carried out by single-stranded conformation polymorphism.

18. The method of claim 13, wherein determining the identity of the allelic variant is carried out by allele specific hybridization.

19. The method of claim 13, wherein determining the identity of the allelic variant is carried out by primer specific extension.

20. The method of claim 13, wherein determining the identity of the allelic variant is carried out by an oligonucleotide ligation assay.

21. The method of claim 13, wherein the MnSOD gene is a human MnSOD gene.

22. The method of claim 13, wherein the probe or primer has a nucleotide sequence from about 15 to about 30 nucleotides.

23. The method of claim 13, wherein the probe or primer is labeled.

24. A method for determining risk of colorectal cancer in a subject, comprising the steps of:
    a. determining the base identity of a portion of genomic DNA from the subject's cell

sample, said genomic DNA comprising an MnSOD gene comprising a mitochondrial targeting sequence, said portion corresponding to position 351 as defined in SEQ ID NO:1 of said MnSOD gene in said mitochondrial targeting sequence; and

b. correlating said base identity with a risk for colorectal cancer.

25. The method of claim 24; wherein the base identity of position 351 is determined by sequencing a portion of said mitochondrial targeting sequence of said MnSOD gene containing said position 351.

26. The method of claim 24; wherein base identity of said position 351 is determined by digesting said portion of the mitochondrial targeting sequence of said MnSOD gene with a restriction endonuclease appropriate to determine the base identity of said position 351.

27. The method of claim 24; wherein said base identity is determined by examining an RNA fraction from said subject's cell sample, whereby the identity of said genomic DNA at said position 351 can be determined.

28. The method of claim 24; wherein a risk for developing colorectal cancer is assessed to be greater than that of the unaffected relevant population when the base identity at said position 351 is homozygous for C.

29. The method of claim 28; wherein the age of the subject is less than about 35 years.

30. The method of claim 29; wherein the ethnicity of the subject is Hispanic.